

## SOILS AND LAND USE IN THE WEST GIPPSLAND REGION

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The West Gippsland Region, as defined by the Victorian Central Planning Authority (1968), has an area of 5,101 square miles (5.7% of the State). Of this area, 3,153 square miles are occupied, and in 1966-67 there were 9,336 rural holdings with an on-farm population of 37,430. (C. W. Bur. Census Statists., 1969.)

### TOPOGRAPHY

In the north, the Baw Baw plateau rises to over 5,000 ft, and in the south the Strzelecki Ranges to 2,000 ft. Between these two mountainous areas lies the Latrobe Valley, through which the Moe, the Tanjil and the Latrobe Rivers run from W. to E. At the western end of the Region, between Dandenong and Loch, is the large drained Koo-weerup Swamp. Another large area of flat to undulating country is bounded by a line joining Wonthaggi, Leongatha, Fish Creek and Yanakie. To the east of Foster, a narrow coastal plain often less than a mile wide runs to Gelliondale, broadening out around Yarram and Woodside.

### SOILS

The classification of soils for the purpose of this discussion is based on the paper prepared by J. K. M. Skene for the Central Planning Authority Resources Survey of the West Gippsland Region (1968).

Podzolic soils are most widespread in the Region. Important areas of kraznozem occur on Oligocene basalt, and yellowish-grey friable earths are found in the Strzelecki Ranges. Other soil types include acid swamp soils on the Koo-weerup Swamp and around Trafalgar; sandy podzols on the coastal plains between Yanakie and Inverloch; skeletal soils in the higher mountain regions; and small areas of calcareous dune sands along the coast between Western Port and Wilsons Promontory.

#### (1) PODZOLIC SOILS

Podzolic soils in the Region show great diversity. In general they have a bleached subsur-

face, usually with a sharp contrast in texture between surface soil and subsoil. They are acid throughout the profile.

(a) *Lowland sandy soils*: In the Woodside district, these sandy soils are found on undulating plain and low dune country adjoining the Ninety Mile Beach. They are generally slightly acid, and lime is not usually needed for pasture establishment. The principal soil deficiencies are phosphorus, potassium and copper.

(b) *Lowland soils on clay sediments*: These are highly variable. Near Cranbourne, Lang Lang, Yallourn and on French Island they are deep sands, which are strongly acid and require lime for pasture establishment; in other areas, grey loams and clay loams, less strongly acid, are found. Between Yarram and Foster, and near Yannathan, acid swamp soils are associated with this group. Soil deficiencies are phosphorus and potassium, and in the sandy soils and acid swamp soils, copper. Molybdenum is rarely deficient, and may be present at such a high level that it interferes with copper uptake in some of the acid swamp soils.

(c) *Upland soils on miscellaneous rocks*: The parent material for these upland soils is mainly granite in the north of the Region, with some areas of Silurian sedimentary rock. Mesozoic sediments also provide parent material. Granite has given rise to grey, gritty sandy loams varying from slightly acidic to strongly acidic, and the sedimentary rocks to grey loams and fine sandy loams, again of variable acidity. On the granite-derived soils, phosphorus and potassium are the main deficiencies, whilst copper and, much less commonly, molybdenum, may also be required. On soils derived from sedimentary rocks, phosphorus, potassium and molybdenum are the most common deficiencies.

#### (2) SANDY PODZOLS

These are found on the Tertiary and Quaternary sandy deposits of the coastal plains and low dunes in the Inverloch, Tarwin, Yanakie and

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French Island districts. As a group they are more leached than the sandy podzolic soils. Topsoil is commonly extremely acid, and there is frequently a layer of coffee rock in the horizon. These soils almost universally require lime at sowing, and are deficient in phosphorus, potassium and copper.

### (3) YELLOWISH-GREY FRIABLE EARTHS

The yellowish-grey friable earths are formed on the Mesozoic sediments under conditions of high rainfall. These soils are strongly acid, with extremely acid pockets usually at the ends of spurs. They are very well-structured, do not erode badly even in steep country, and particularly at the western end of the Region, are quite fertile. Phosphorus and molybdenum are the main deficiencies. Potassium may be required where potatoes have been grown or where hay has been cut for many years.

### (4) KRASNOZEMS

The krasnozems are derived from Oligocene basalt, and are deep friable soils, moderately to strongly acid. They are uniformly deficient in phosphorus, and commonly in potassium and molybdenum.

### (5) ACID SWAMP SOILS

Both peaty and non-peaty types of acid swamp soils occur in the Region. The peaty types are strongly acid and well-structured and are found in small areas on the Kooweerup Swamp and at Yanakie. More common are the non-peaty types, which fringe the peaty soils and are present in many of the smaller swamps. They are commonly strongly acid grey clay loams. Phosphorus is the main deficiency, but potassium may also be required. Lime may be needed at establishment.

### (6) CALCAREOUS DUNE SANDS

Small areas of siliceous dune sand with calcium carbonate shell fragments fringe the coast between Wilsons Promontory and Western Port. These soils are low in fertility and deficient in phosphorus, potassium, copper and cobalt.

### (7) SKELETAL SOILS

Skeletal soils occur mainly on Silurian sedimentary rocks north of Walhalla and on the

granite on Wilsons Promontory. They are under forest and are not agriculturally important.

## LAND USE

Of the 3.2 million acres in the Region, 1.3 million lie in the upland areas of the Baw Baw Plateau and part of the Eastern Strzeleckis, and are not used for agricultural production. Of the remaining 1.9 million acres, 1.3 million are sown to pasture and a further 0.3 million carry so-called native pasture. Livestock numbers (C. W. Bur. Census Statists., 1969) are set out in Table 1.

## THE DAIRY INDUSTRY

Dairying is the main agricultural industry in the Region and two-thirds of total holdings in West Gippsland are dairy farms. Approximately 80% of these holdings milk more than 40 cows.

Cattle graze mainly on unirrigated pasture with supplementary feeding of hay or silage in winter and late summer when pasture feed is in short supply: about two-thirds of annual pasture production occurs in the three spring months. Fodder crops are used to supplement feed on some farms, but the area sown to such crops is declining. An increasing area is topdressed with nitrogen to supplement winter and early spring feed from pastures.

West Gippsland now carries 30% of the State's dairy herd. The total number of dairy farms has decreased but average herd size has increased, and 50% of Metropolitan Milk Zone Supplies are produced in the Region. From 1959-60 to 1966-67, milk production increased by more than 50%, and dairy production is found on all soil types.

## THE BEEF INDUSTRY

Beef cattle numbers are climbing rapidly and are now thought to be a little over 200,000. British breeds are the most common, but there is also interest in exotic breeds. Beef is also produced from cull dairy cows, and there is a good deal of interest in half-bred dairy-beef cross animals.

Though beef herds are spread throughout the Region, they are more usual in South Gippsland (i.e. south of the Grand Ridge Road).

TABLE 1  
Livestock Numbers, West Gippsland—5 year averages

Type	1943-7	1948-52	1953-7	1958-62	1964-5 (actual)	1966-7 (actual)
Dairy cattle	355,100	396,400	453,600	489,000	544,000	578,450
Beef cattle	87,000	101,000	108,700	142,700	188,300	225,350
Sheep and lambs	522,100	620,900	769,000	845,900	906,900	1,226,400
Pigs	59,300	38,100	43,500	52,900	72,200	58,050



## THE SHEEP INDUSTRY

Only about 3% of the State's flock is found in West Gippsland, and these are mostly in the south. The main production is in fat lambs, using Southdown or Dorset Horn rams over first cross Merino-Border Leicester ewes. There are a few Merino and Corriedale flocks. Some farmers import weaners from other districts for fattening, and sale in late spring and autumn.

## POTATO GROWING

Potatoes are grown principally in the Thorpdale and Kooweerup districts, and there has been a recent increase in the area sown. Now, approximately 10,000 acres are used for potato growing, mainly with supplementary irrigation. The main varieties grown in order of importance, are Sequoia, Sebago, Kennebec and Exton. In 1968-69, West Gippsland produced 54,000 tons of potatoes, 20% of the State's total production.

## OTHER VEGETABLES

Approximately 7,000 acres mainly in the Kooweerup Swamp area are sown to vegetables each year, and nearly 15% of the State's vegetables are produced in the Region. Green peas, asparagus, sweet corn and onions are the major crops, and there has been a recent expansion of pea growing for frozen pea production. In the Warragul district 725 acres were sown to peas in 1968-69, and 625 acres were sown for the 1969-70 harvest.

## FRUIT AND BERRIES

About 3,000 acres of the area are used to grow fruit and berries, with apples the main crop. Around Gembrook, in the far north-west of the Region, some strawberries are grown.

## PASTURES

Pastures of native grasses are rare. There are one and a half million acres of pasture in the Region, of which about one million are topdressed each year with superphosphate or super plus potash.

Pastures usually consist of perennial rye grass (*Lolium perenne*), white clover (*Trifolium repens*), and subterranean clover (*Trifolium subterraneum*), with other sown species and weeds to a varying extent.

Cocksfoot (*Dactylis glomerata*) is common on the friable hill soils, and red clover (*Trifolium pratense*) and strawberry clover (*Trifolium fragiferum*) are common in new sowings and wetter areas, respectively, *Phalaris tuberosa* is grown to some extent on the Kooweerup Swamp. Lucerne is rarely grown as it seldom does well, probably because of the acid soils and waterlogging.

Volunteer species, which occur to a variable extent, are Yorkshire fog grass (*Holcus lanatus*), crested dog's tail (*Cynosurus cristatus*), hair grass (*Vulpia myuros*), sweet vernal (*Anthoxanthum odoratum*), volunteer clovers, e.g. suckling clover (*Trifolium dubium*), and various lotus species.

Weeds commonly seen in pastures are flatweed (*Hypochaeris radicata*), ribgrass (*Plantago lanceolata*), and daisy (*Bellis perennis*). Others relatively common are bracken (*Pteridium aquilinum*), ragwort (*Senecio jacobaea*), rushes (*Juncus polyanthenus* and others), blackberry (*Rubus fruticosus*), thistles (*Cirsium vulgare*, *Cirsium arvense*, *Cardus pycnocephalus*), capeweed (*Cryptostemma calendula*), wild radish (*Raphanus raphanistrum*), docks and sorrel (*Rumex* spp.).

The area of pasture has increased only slightly in the last 20 years. However, the number of dairy cattle has increased by 60%, of beef cattle by 120%, and sheep by 75%, largely because of pasture improvement. The principal fertilizers used are superphosphate and potash, and pasture responses to molybdenum, copper and lime have been recorded. Table 2 shows the increase in the use of artificial fertilizers.

Of 'other' fertilizers (mainly K), West Gippsland absorbs about 40% of the Victorian total usage for pastures, and 27% of the Victorian net total for all uses.

Aerial topdressing is gaining popularity, mainly

TABLE 2

5-Year Period	Use of Artificial Fertilizers—West Gippsland Region			Total		
	Area (acres)	Super (cwt)	Other (cwt)	Area (acres)	Super (cwt)	Other (cwt)
1943-47	456,700	588,900	11,100	546,200	721,700	70,000
1948-52	785,200	1,084,200	19,700	862,200	1,241,400	67,500
1953-57	885,100	1,234,500	74,500	983,800	1,399,400	151,100
1958-62	1,001,900	1,339,800	209,300	1,099,500	1,492,100	326,200
Actual						
1964-65	1,132,800	1,607,600	261,600	1,180,100	1,686,000	486,400
1966-67	1,195,023	1,697,285	528,043	1,239,732	1,775,517	679,555

in the steeper areas, and some aerial weed-spraying is conducted, chiefly by the Lands Department, in ragwort control.

### FODDER CONSERVATION

Hay and silage making is almost solely from excess spring pasture (98% of hay produced in the Region was pasture hay in 1965). Less than 2,000 acres of oaten hay were baled in 1966.

About 10% of the pasture area is cut for hay in normal years, amounting to some 350,000 tons at an average rate of nearly 2 tons per acre. Similarly, in normal years about 20,000 acres are cut for silage.

Fodder crops are not grown extensively though there are some useful small areas of oats for winter green feed and hay, and of turnips and maize for summer feed. About 18,000 acres is sown to oats, about 6,000 to maize, and another 6,000 to turnips. As well as conserved fodder most dairy farmers supplement feed, commonly with crushed oats, brewers' grains or proprietary feed lines.

### CONCLUSION

The most significant feature of agricultural development in the Region during the last 15 years has been a steady increase in production. Fertilizer programmes matched to soil needs have

given a marked lift in pasture and crop production, and in turn, increased pasture has led to increased stocking rates and higher per acre production. The growing adoption of labour-saving facilities such as herringbone cow-sheds, and also improved farm organization, have enabled increased costs of production to be met by higher productivity.

The actual number of rural holdings is falling. This is partly because of amalgamation of smaller properties and partly because some areas of steep country are being planted to timber. Areas of bush country, mainly to the north of the Princes Highway, have been cleared and sown to pasture. Small areas of vegetables for processing, mainly peas, have been sown under contract for the last two seasons in the west of the Region. More profitable and less wasteful ways of utilizing surplus dairy stock for beef production are being investigated and developed.

In the short term these trends should continue. They demand increasing skill in decision-making for farmers and a changing role for their advisers.

### REFERENCES

- COMMONWEALTH BUREAU OF CENSUS AND STATISTICS 1969, *Victorian Rural Industries 1966/67*.  
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